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amusement. I do not promise to present my efforts to the public, that must depend upon circumstances.

That with which you conclude your Letter has not escaped my notice. The Libration of the Moon from North to South as well as from East to West. I am much obliged to you Sir for this and the other observations, in which you have freed me from my embarraſsments. I hope to be pardon'd if when other difficulties arise I am constrain'd to make application for your instruction.

I have the honor to be with very great Respect
Sir
Your very much obliged
and most obedient
humble servant
John Ruſsell.

Mortimer Street
Feby 19, 1789.

Details of the Total Solar Eclipse of 1896 *August* 8–9 *for Kushiro, in the island of Yezo.*

(*Communicated by the Superintendent of the "Nautical Almanac."*)

The following details are communicated to the Society, as it is understood that Kushiro has been selected as one of the stations to be occupied by the observers of the Joint Permanent Eclipse Committee, who are going out to Japan next August. Should a second station be selected within fifty or sixty miles of Kushiro, the circumstances of the eclipse for it can be computed, with sensible accuracy, from the subjoined equations.

The details for Horonai, on the N.E. coast of Yezo, will be found in *Nautical Almanac Circular*, No. 15.

The elements adopted in the computations are those published in the *Nautical Almanac* for 1896, p. 416.

Assumed position of Kushiro... ... Long. 144° 22′ E., Lat. 42° 58′ N.
(reduction to $l - 11'.7$)

		d	h	m	s	Contact from N. Point.	Contact from Vertex.	Sun's Altitude.
Eclipse begins	Aug.	9	2	6	46	55° W.	94° W.	53°
Totality begins	,,	9	3	16	52	Duration $2^{m}\ 35^{s}.5$		42°
Totality ends	,,	9	3	19	27			
Eclipse ends	,,	9	4	23	44	123° E.	73° E.	30°

Local mean times and *direct* image.

For any place not far distant the geocentric north latitude being l, and east longitude λ, the Greenwich mean time t of

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partial beginning may be approximately computed from the following formulæ :—

$$\cos\omega = +1{\cdot}12272 - [0{\cdot}16735]\sin l + [0{\cdot}05786]\cos l\cos(\lambda - 46^\circ\ 10'{\cdot}9)$$

$$t = \text{Aug. } 8^{\text{d}}\ 17^{\text{h}}\ 38^{\text{m}}\ 15^{\text{s}} - [3{\cdot}65074]\sin\omega - [3{\cdot}65552]\sin l$$
$$- [3{\cdot}84426]\cos l\cos(\lambda - 12^\circ\ 40'{\cdot}8)$$

Contact on $\odot$'s limb, $\omega - 34^\circ\ 31'{\cdot}1$ from the N. point towards the W.

and the Greenwich mean time of partial ending by—

$$\cos\omega = +1{\cdot}52241 - [0{\cdot}18107]\sin l + [0{\cdot}03061]\cos l\cos(\lambda - 14^\circ\ 21'{\cdot}7)$$

$$t = \text{Aug. } 8^{\text{d}}\ 17^{\text{h}}\ 12^{\text{m}}\ 18^{\text{s}} + [3{\cdot}57870]\sin\omega - [3{\cdot}55219]\sin l$$
$$- [3{\cdot}78268]\cos l\cos(\lambda + 19^\circ\ 13'{\cdot}1)$$

Contact on $\odot$'s limb, $\omega + 31^\circ\ 48'{\cdot}0$ from the N. point towards the E.

Also the Greenwich mean times of the beginning and ending of totality may be approximately computed from the following formulæ in which the upper sign applies to the beginning, and the lower sign to the ending :—

$$\cos\omega = +70{\cdot}69521 - [1{\cdot}88965]\sin l + [1{\cdot}76504]\cos l\cos(\lambda - 29^\circ\ 43'{\cdot}0)$$

$$t = \text{Aug. } 8^{\text{d}}\ 17^{\text{h}}\ 19^{\text{m}}\ 17^{\text{s}} \mp [1{\cdot}89913]\sin\omega - [3{\cdot}61011]\sin l$$
$$- [3{\cdot}81343]\cos l\cos(\lambda + 3^\circ\ 38'{\cdot}3)$$

The quantities in square brackets are logarithms, those in the second equation of each pair being logarithms of seconds of time.

"*Nautical Almanac*" *Office :*
1896 *January* 2.

On the Proper Motion of μ *Cassiopeiæ.* By W. T. Lynn, B.A.

In the upper part of the left arm of *Cassiopeia*, Bayer has marked two stars, but appears to have inadvertently omitted to letter the brighter one on his map of the constellation. But from the subsequent letterpress it is clear that he intended to indicate it by the letter θ. The fainter star in its immediate proximity he marked by the Greek letter μ. This latter star has long been well known to be endowed with a large proper motion in both elements, whilst the proper motion of θ is very small. In some future age it may perhaps be found that μ is in orbital motion round θ, and a very gigantic motion this would be. No attempt has yet been made to determine the parallax of the latter; but the late Professor Pritchard obtained an approximate measurement of that of μ by the photographic method, the result being (value found, $0''{\cdot}04$), that its large proper motion is not due to any special proximity.

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